DOCUMENT RESUME

ED 159 390 08 CE 017 448

TITLE	Implementing Performance-Based Vocational Education Utilizing V-TECS Catalogs. Module 8. Managing Self-Paced Instruction.
INSTITUTION	Clemson Univ., S.C. Vocational Education Media Center.; South Carolina State Dept. of Education, Columbia. Office of Vocational Education.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	78
GRANT	G007702222
NOTE	37p.; For related documents see CE 017 440-449
AVAILABLE FROM	Vocational Education Media Center, 10 Tillman Hall, Clemson University, Clemson, South Carolina 29631 ($7.50)
EDRS PRICE	MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS	*Class Management; *Individualized Instruction; Inservice Teacher Education; Learning Modules; *Performance Based Education; Teacher Role; *Vocational Education
IDENTIFIERS	Vocational Technical Education Consortium States

ABSTRACT

This learning module on managing self-paced instruction is one of nine developed for use in training administrators, teachers, and prospective teachers in the utilization of Vocational-Technical Education Consortium of States (V-TECS) catalogs of performance objectives, criteria-referenced measures, and performance guides. Information is provided on the following subject areas: managing self-paced instruction, the role of the instructor, management of slow and fast learners, suggestions for starting a self-paced program, record keeping and filing, facilities for self-paced instruction, and the use of simulators and kits. Examples of module behavioral objectives are these: be able to identify a definition of self-pacing, two requirements of self-paced materials, alternate methods of self-pacing, the role(s) of the teacher in managing a self-paced system, and the three categories for storing modules. A glossary of terms, a glossary self check, and two self checks on module information are provided. (An instructor's handbook--CE 017 440--for use with all the modules contains the checkout activity for this module, a multiple choice test keyed to the behavioral objectives stated at the beginning of the module. The modules are designed for use with individuals or with groups.) (JH)

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ED159390

Implementing Performance-Based Vocational Education
Utilizing V-TECS Catalogs

MODULE 8

MANAGING SELF-PACED INSTRUCTION

State Department of Education
Office of Vocational Education
Columbia, South Carolina 29201

In cooperation with

Vocational Education Media Center
Clemson University
Clemson, South Carolina 29631

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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1978

CE 017 448

These materials have been developed from funds
provided by grant G007702222 under the
Vocational Education Act of 1963 P.L. 88-210 as Amended
Department of Health, Education and Welfare, Office of Education

INTRODUCTION:

Perhaps the most challenging aspect of performance-based education relates to the use of self-paced instruction as a method (mode). As mentioned earlier, self-pacing is a mode of instruction which allows students to progress independently and at their own rate from one task to another. In order for students to study independently and with very little, if any, help from the instructor, they must have self-directional, self-instructional materials. These materials are usually packaged in the form of modules or learning activity packages.

Organizing the instructional program to effectively utilize self-pacing requires most of the skills needed by teachers utilizing a predominately group mode as well as some new skills. One of these skills is that of preparing a module of instruction (when such modules are not already available). This module will help you to better organize your program for self-pacing.

DIRECTIONS:

Modules 5 & 7 should be completed before beginning work on this module.

Read the OBJECTIVE section. If you think you can accomplish this objective now, turn the CHECK-OUT ACTIVITY, page 28, and follow the instructions.

If you feel you are not able to accomplish this objective now, look at the LEARNING ACTIVITIES on this page. Begin the learning activities and as soon as you feel you are ready, turn to the CHECK-OUT ACTIVITY, page 28, and follow the instructions.

OBJECTIVES:

1. Given instructional materials developed for this module, the participant will be able, with 100 percent accuracy, to identify on an objective post-test:
   a. a definition of self-pacing
   b. two requirements of self-paced materials
   c. alternate methods of self-pacing
   d. the role(s) of the teacher in managing a self-paced system
   e. the three categories for storing modules
2. Given instructional materials developed for this module, the participant will be able, with 100 percent accuracy, to label characteristics of slow learners and more capable students.
3. Given instructional materials developed for this module, the participant will be able, with 100 percent accuracy, to label techniques appropriate for teaching slower students and those more appropriate for the more capable students.

LEARNING ACTIVITIES:

1. READ the Glossary of Terms for Module eight.
2. CHECK YOUR KNOWLEDGE by performing Self-Check I, the Glossary of Terms for Module eight.
3. READ Section I – Managing Self-Paced Instruction.
   (or)_____
4. READ Section II – Role of the Instructor in a Self-Paced Program.
   (or)_____
5. READ Section III – Management of Slow and Fast Learners in a Self-Paced Performance-Based Program.
   (or)_____
6. READ Section IV – Suggestions for Starting a Self-Paced Program.
   (or)_____
7. CHECK YOUR KNOWLEDGE by performing Self-Check II – Starting a Self-Paced Program.
8. READ Section V – Record keeping and Filing.
   (or)_____
9. READ Section VI – Facilities for Self-Paced Instruction.
   (or)_____

10. READ Section VII – The Use of Simulators and Kits
(or)_____
11. Turn to the CHECK-OUT ACTIVITY, p. 28, and follow the instruction.

GLOSSARY OF TERMS – MODULE 8

In this module there are terms used with which you may not be familiar. Read through the glossary. Then, check your knowledge by answering the self-check on a separate sheet of paper. Compare your answers with those found at the end of this activity.

Carrel – a small desk or table enclosed on three sides used mainly to provide privacy when studying in a self-instruction program. Audiovisual media are often included in each cubicle.

Kit – a collection of tools, equipment materials (including printed materials), necessary for the accomplishment of a specified task or tasks. The collection is usually stored in a box.

Learning Center*– a learning environment which has been specifically developed to foster individualized instruction, and which emphasizes employment of media to augment textbooks and manuals.

Learning station – an area of the classroom, shop or library set aside permanently or temporarily for the performance of a selected learning activity or activities.

Live project – a learning activity utilizing an actual situation or actual, functioning equipment.

Simulation – a training device or a training situation which makes use of hypothetical situations or equipment (other than actual equipment) for training.

Simulator – a training device used to serve as a substitute for the actual device to provide practice.

*Department of the Air Force, Instructional System Development (Washington, D.C.: Air Training Command), 1975, p. A1-4.

GLOSSARY SELF–CHECK

Directions: Match the following terms and definitions.

TERMS

a. Carrel
b. Kit
c. Learning Center
d. Learning Station
e. Live project
f. Simulation
g. Simulator

DEFINITIONS

1. – a collection of tools, equipment materials (including printed materials) necessary for the accomplishment of a specified task or tasks. The collection is usually stored in a box.

2. – a training device used to serve as a substitute for the actual device to provide practice.

3. – a learning activity utilizing an actual situation or actual, functioning equipment.

4. – a training device or a training situation which makes use of hypothetical situations or equipment (other than actual equipment) for training.

5. – a small desk or table enclosed on three sides used mainly to provide privacy when studying in a self-instruction program. Audiovisual media are often included in each cubical.

6. – an area of the classroom, shop or library set aside permanently or temporarily for the performance of a selected learning activity or activities.

7. – a learning enviroment which has been specifically developed to foster individualized instruction, and which emphasizes employment of media to augment textbooks and manuals. (Air Force Manual 50-2)

GLOSSARY SELF-CHECK

Answer Key

1. b, 2. g, 3. e, 4. f, 5. a, 6. d, 7. c

SECTION I

MANAGING SELF–PACED INSTRUCTION

As mentioned earlier, self-pacing is perhaps the most challenging mode of delivery for performance-based education. Self-pacing may require a more qualified, dedicated, resourceful, imaginative and competent teacher. But, the creation of an effective self-paced program has definite rewards for both the teacher and the student. The teacher is relieved of the demoralizing and thankless task of repeating basic information over and over again. By using selected technology in the form of self-instructional modules which take advantage of printed and audio-visual presentations, the instructor is freed to use his/her time in other more productive endeavors. The instructor can spend time doing the tasks technology cannot do better – counseling students, analyzing, learning problems of students, and encouraging and inspiring students.

But, self-pacing is not easy – its advocates "never promised us a rose garden." It probably requires more pre-planning than conventional (group) instruction. In the beginning stages, most of the instructor's time will be spent planning and constructing individualized learning materials, learning stations, learning centers, and filing and storage facilities.

SECTION II

ROLE OF THE INSTRUCTOR IN A SELF–PACED PROGRAM

When the role of the teacher using the group mode is compared with that of the teacher using the self-paced mode, the teacher using the self-paced mode:

1. spends less time organizing and conducting group activities, discussions, projects, lectures, field trips, etc.

2. spends more time:

   a. obtaining or preparing self-instructional, self-directional materials for use by students.
   b. arranging learning stations and simulated learning experiences which can be accomplished by a student working alone with little, if any, dependence upon the instructor.
   c. evaluating student progress on an individual basis.
   d. keeping individual progress records.
   e. organizing and storing self-directional, self-instructional materials or modules.
   f. giving aid to students on an individual basis.
   g. providing "jiffy" or extemporaneous demonstrations.
   h. supervising the use of a learning center.
   i. diagnosing learning difficulties.
   j. suggesting alternative learning activities.
   k. encouraging students by helping to "purpose" instruction.

ADVANTAGES AND DISADVANTAGES OF SELF–PACING

Self-pacing as a method(mode) of instruction offers a very clear-cut means of delivering performance-based education. Clear-cut in that accountability task by task and student by student is made easy to ascertain and students are provided time to master each task. The individual student needs and learning styles are not necessarily considered – but, of course, neither are such needs necessarily considered in a group setting.

Self-pacing provides freedom of time but says nothing about the other freedoms expressed in the four forms of individualization. Self-pacing, in terms of the four forms of individualized instruction discussed in Module 5, can be described as the prescribed form of individualization. This is because usually both objectives and learning activities are prescribed by the course or the instructor. If time, money and facilities were available, this would not be necessary. Modules could be selected by the student and a variety of learning activities could be provided. Only then would the program be fully individualized. Since time, money and facilities are not available to most instructors, the self-paced method(mode) with the prescribed form of individualization may, at this time, be the most practical form of individualization.

As mentioned in Module 4, it is anticipated that most vocational courses will use the group approach for some tasks or entire units of instruction, while the self-paced approach would be appropriate for other tasks or entire units.

In summary, self-pacing through the use of self-instructional modules has advantages and disadvantages:

Advantages

1. Students are given freedom of time.

2. Validity of the program is easily assured – objectives, learning activities and criterion-referenced measures are neatly packaged for student learning and evaluation.

3. The more capable students are not delayed by the slower students.

4. The slower student is allowed to take the time necessary to master each task.

5. The stage is set for an open entry–open exit system at some future time.

Disadvantages

1. Self-pacing as normally designed does not guarantee individualization. Usually both the objectives and learning activities are selected or required by the course (or instructor) and are not selected by the student. Usually little or no provision is made for adapting modules to the individual needs or learning styles of students.

2. It is difficult to schedule group activities and yet maintain a self-paced program.

3. Without group activities to provide a forum for student interaction, motivation may be more difficult to maintain.

4. Modularization is almost dictated by the type of self-pacing most commonly used. This modularization fragments the curriculum to the point that integration or problem solving on an integrated basis becomes very difficult.

5. The modularization of the curriculum may also make it difficult to use live or actual projects and often results in the use of simulated tasks which, while appropriate in some cases, may not provide the purposing, problem solving and integrated context of a live or actual project.

6. The reorganization or reconstruction of curriculum materials in a self-directional, self-instructional format for self-pacing is expensive and time consuming.

SECTION III

MANAGEMENT OF SLOW AND FAST LEARNERS IN A SELF–PACED PERFORMANCE–BASED PROGRAM

At first glance it might appear that self-pacing would be the solution to the problem of having slow and fast learners in the same class. The faster learners are not as inhibited by slower learners as they might be when a group delivery mode is used. And slower learners are given the freedom to master. But, problems do occur. Slow learners can become discouraged and frustrated by the progress of the faster learners. And faster learners may say "Why do five modules each week if others are doing only two or three?" Incentives can be provided, such as giving letter grades based on the number of modules completed. However, this may revert back to norm-referenced measurement (which in part, defeats the purpose of performance-based instruction with its emphasis on criterion-referenced measurement) unless such grade standards were based only on fixed standards and not on a student by student comparison.

As mentioned earlier, most self-paced instruction in vocational education will probably be of the prescribed type. i.e., objectives and learning activities will be preselected and fixed in each module. Ideally, provisions would be made to tailor-make both the objectives and the learning activities to each student. This in effect would mean a different module for each student, tailor-made to his/her own specific interest, needs and learning styles. Such modules could not be developed by anyone other than the instructor of the particular student. The development of such programs are being advocated for the handicapped.

Perhaps the most feasible alternate for the vocational teacher is to try to adopt modules published in quantity for students in general by supplementing these modules with alternative objectives, learning activities and references.

SLOW AND FAST LEARNERS IN COMPETENCY–BASED (PERFORMANCE–BASED)* PROGRAMS [1]

There is no question that the various levels of learning rates and abilities will present certain management problems for the instructor.

Most classes typically divide into three groups: (1) the average group which moves fairly well at the anticipated rate of speed (it is this group for which most of the planning is done); (2) the faster group which paces itself ahead of the average group (it is this group which needs extra planning and often fails to get it); and (3) the slower learners who move at a lower rate than the average group (it is this group which perplexes instructors the most). Slower learners tend to lose interest and often create disturbances for other students. These students need positive reinforcement in the form of success and approval. Bored capable students also become behavioral problems–they too need positive reinforcement in the form of success and approval. Teachers often fail to recognize this need in capable students.

There are at least two general suggestions for solving management problems which relate to both slower and more capable students:

1. Students need instructional materials written specifically for their reading level. Once the instructor has determined the reading capabilities of his/her students, he/she ought to have sufficient references and resources to offer alternative materials to meet varying student needs from challenging good readers to encouraging poor readers. This may mean taking a student's module and writing in on the alternative activity space a simpler or a more advanced text or resource.

2. It is vital that all students in the class, whatever their learning capabilities, be provided with opportunities for initial and frequent success. Most authorities

[1] Bureau of Vocational Education, Managing Instruction, Inservice Education Module 10 (Lexington, Kentucky: State Department of Education and the Department of Vocational Education). n.d., pages not numbered.

*Added by this author.

see this as a crucial factor in motivating students toward further learning and maintaining the self-esteem that leads to realistic confidence and continued effort. Student self-checks, wherein students can check their own progress, are one form of reinforcement. The modules should provide self-checks for the student's use in assessing his/her progress. You may be able to provide additional self-checks by setting up project stations in the lab. Honest praise from the instructor is a valuable form of reinforcement. Most importantly, the student should be given initial tasks which are easily accomplished before attempting more difficult complex tasks.

Techniques of Instruction for the Slower Student

Using individualized learning materials with well-selected reference materials, the slower student can progress at his/her own rate and use learning techniques developed for his/her own mental style. Less capable students tend to have higher absentee rates, so materials that permit them to catch up when they do return to class will help prevent them from falling hopelessly behind the rest of the group. Given the general learning characteristics of the slower student (listed earlier), the following teaching techniques are suggested. Each instructor will be able to think of ways to apply these techniques in using individualized instructional modules.

1. Provide opportunity for plenty of practice and drill. Practice can strengthen the bonds of learning and lead to greater and longer retention. Include alternative and/or additional learning activities which encourage practice and repetition without boredom.

2. Provide the time necessary to learn. If the slower student needs more time to master the new subject, arrange for him/her to have time. Some ways to provide more time are: open laboratory time after school and special small-group learning sessions.

3. Occasionally allow a student to change to another module if there is no basic skill involved which he/she has not yet learned and as long as he/she goes back and completes his/her original task. Slow learners often feel that what somebody else is doing is more exciting and interesting, especially if they are having to spend more than average time on a module.

4. Change the media for students who are nonreaders or very poor readers. Put the necessary reading material on a tape which the student can play and replay. Or read aloud to the student as needed. Reinforce with visual aids. (These need not be beautiful visual aids—just functional.) This requires time, but remember that in competency-based (performance-based)* individualized-based (self-paced)* instruction, the program is structured to fit the student.

5. Use visual aids. Slower students can profit more from seeing a skill well demonstrated than from a verbal discussion. A well-presented (or repeated) demonstration, slide-tape presentation or illustration helps to clear up what might otherwise be confusing or meaningless. There is also the psychological effect on the students of seeing that the operation can actually be done. Use a great many types of visual aids, constantly supporting verbal instruction with good, clear, visual images. Wall charts, illustrations of tools, etc., may help a student refresh his/her memory. Be sure that the student knows how to operate audio-visual equipment so he/she will be able to go to these as often as he/she needs.

6. Utilize real experiences related to the classroom instruction. Field trips specially planned to show certain operations being performed will help. Several short field experiences with definite objectives are better than one or two long trips with many confusing impressions. If possible, help students get work in real experiences early, even if the tasks are low level. These kinds of

*Added by this author.

experiences give meaning to the student. He/she can see how he/she will use skills, why he/she needs to learn them.

7. Use a physical approach to learning. These modules should have opportunity for student hands-on experiences. Encourage "dry-runs" to build confidence. Arrange for the first attempts at a new process to be free of serious consequences. Working on a mannequin or model of some sort relieves the anxiety of the consequences of mistakes.

8. Encourage the student to take small steps. The slower student may want to "jump right in" and try to complete a module before he/she has taken the necessary steps to ensure success. Needing immediate gratification, this student should be led to find gratification in the completion of smaller steps. Praise step-by-step completion behavior.

9. Teach basic "know-how" to slower students as well as culturally deprived students. Do not assume that every student knows how to operate audio-visual equipment or knows how to fill out a form (or use a screwdriver).*

10. Utilize a reward system for good work. The structure of the modules has built-in a reward system of sorts. Completion of each learning activity is a small reward. Modules short enough not to require long periods of time are a reward. The completion of one module, fully accomplished, is a reward. Give praise and recognition to student accomplishments.

11. Provide an atmosphere of low tension and low stress in the classroom and laboratory. Less capable students do not function well in stress situations, but tend to become anxious, forget what they have learned, and make mistakes. Provide an atmosphere in which honest errors can be tolerated, where the pressure to produce against time is minimal, and where other students' ridicule is absent.

*Added by this author.

12. Peer instruction may also be helpful in teaching slower students. Slower students may feel less intimidated if instruction is sometimes provided by a fellow student. A fellow student is sometimes more effective in understanding the learning difficulty of another student, or in communicating directions than is the teacher.

Techniques of Instruction for the More Capable Student

The more capable student, too, deserves to have instruction planned for his/her unique abilities and needs. The instructor cannot assume that the especially able student will naturally be an excellent student and will achieve to his/her highest potential. It may be that because the student learns readily he/she will become bored, frustrated in his/her progress, and lose interest. The real and basic problem for the instructor, then is to keep the more capable student challenged with meaningful opportunities to learn.

1. Having determined that a student is a more capable one, further individualize his/her instructional modules by adding to his/her specific modules activities and readings which will be challenging and enriching to him/her. The modules are designed to provide basic skill instruction; the capable student may quickly move beyond basic learning and experiences toward refining skills and knowledge. Write in these alternatives and additions in the space provided. The additional activity should not be simply further repetition of what has already been accomplished, but advanced work designed to extend the student's abilities. It is often effective to have the able student suggest plans for himself/herself that go beyond normal classroom work.

2. Have a file of enriching activities which will enable the student to use his/her time productively. This may be a 5 x 7 index file with suggestions for readings, skill practice, or a variety of related activities. Each instructor can use his/her past experience and imagination to put such a file together. There may be a motor which needs work done on it,

children's activities to be planned, records to be worked on or any number of activities. Have a clear understanding that all time will be used productively, that early finishers do not leave or "goof off."

3. Maintain high expectations. The more capable student responds well to reasonable scholastic pressure. High expectations by the teacher lead to high expectations by the student for himself/herself, and he/she will work hard to live up to them.

4. Evaluate the student's work with care and thoughtfulness. Like others, able students need praise and reward for exceptional results, but they respond positively to expert criticism of their efforts and probing questions about their knowledge. They need to be made aware that there is always more to learn. The teacher should ask the student why he/she did what he/she did, as well as how well he/she accomplished the job.

5. Provisions should be made for more capable students to move on to other modules when a module has been completed (self-pacing).*

6. Use learning activities that give the more capable student an opportunity to use his/her ability to create and communicate. A few examples follow: (These may also be included as part of the enriching file.)

   Independent Study – A student can select a related area or phase of the lesson and do more in-depth work in that area (e.g., a student reads an article on new developments in 24-hour banking service; another experiments with a new electronic oven).

   Group Work – Several more capable students may select an area of mutual interest to study as a group. A class report could conclude the work (e.g., students in dental auxiliary carry out a survey of the current demand for dental assistants in the community).

   Technical Reports – Individuals or teams can do library research or laboratory experiments and prepare reports of their work either in written or oral form.

   Leadership Opportunities – A student may be able to tutor another student, direct a group of students in an activity, serve as a teacher's aide, or prepare a demonstration for the class, (peer instruction).*

   Use of Community Resources – A student can arrange to visit a person or place in the community to gain further knowledge, or become involved in a related community project (e.g., an office practice student works as a volunteer in the office of a local charitable organization).

   Creative and Inventive Activities – A truly unusual student might do valuable creative work, actually making a contribution to the field. Opportunity for this to happen should be provided (e.g., an agriculture student devises a new piece of farm equipment; a home economics student develops a salable toy for infants).

*Added by this author.

SECTION IV

SUGGESTIONS FOR STARTING A SELF–PACED PROGRAM

Suggestions For Starting A Totally Self-Paced Program

Assuming a class of 15 students and modules which have a definite assigned sequence for an entire course, self-pacing can be introduced by obtaining at least 15 sets of modules so that each student would start with Module 1 and proceed through the entire set. It would, however, be unusual to have a definite sequence for an entire course. It is, however, not unusual for the first unit to be prerequisite to the remainder of the units. Assuming that units must be in a definite sequence, multiple sets of other units will also be required. The number of sets of each unit required should diminish as students progress. In the interest of economy, it may be necessary to provide each program with a fixed number of sets – possibly five. This would require some students to start with a different module. In cases where an absolute sequence is demanded each student will have to have a set of modules, or some provisions would have to be made for starting students one at a time.

Perhaps a management chart similar to the sample shown on page 14, may be helpful to the instructor in the preliminary planning stage. Note that prerequisite modules should be scheduled as early as possible in order that modules which have prerequisites can be assigned. Note also that if only one kit is available for a module requiring the use of a kit, only one student can be assigned to this module at a time even if five sets of modules are available.

STUDENT SELF-CHECK II

Check your knowledge of managing a self-paced program by responding to the following situation:

1. You are teaching a class of 15 students enrolled in a tractor mechanics course.

2. You are given three sets of 30 modules which cover three duty areas as shown on the Management Chart on pages14and15.

3. Prerequisites for modules requiring prerequisites are indicated on the Management Chart (see Column A).

4. Duty sequence is not critical,i.e.,you may start students in any duty group.

5. The type of learning station required for a particular module is indicated for that module in columns B – F of the Management Chart.

6. The number of sets of equipment available at a station for a particular module is indicated in columns B – Fof the Management Chart.

7. Students are listed in columns 1 – 15.

You are to assign the 15 students listed in any manner you wish – there is, of course, no one correct system. However, you must consider that some modules require prerequisites, some have only one set of equipment per module and you have only three sets of the 30 modules.

Remember – there is no one correct system of making these assignments. However, this exercise will help you get the feel for one of the first problems encountered in implementing self-paced instruction.

PLEASE INDICATE YOUR RESPONSE ON A SEPARATE SHEET OF PAPER. (You may pencil in your responses very lightly on the chart shown on pages 14 and 15, but be sure to erase after completing the Self-Checks.)

Compare your responses with the model given on pages 16 and 17.

STUDENTS

1. John	6. Debbie	11. Ken
2. Tom	7. Pat	12. Joe
3. Mary	8. Ted	13. Jack
4. Dick	9. Ruth	14. Jim
5. Jane	10. Tim	15. Lou

MANAGEMENT CHART

MODULES

DUTY 1	A	B	C	D	E	F
1. Install sparkplugs					*	
2. Remove, inspect and replace flywheel				(2) *		
3. Replace point plunger			*			
4. Replace points and condenser			(2) *			
5. Adjust armature air gap	(3)		*			
6. Test and replace coil						*
7. Test and replace ignition wires					*	
8. Time ignition system	(3) (5)				*	
9. Test and replace diode rectifier				(3) *		
10. Trouble shoot a capacitor discharge ignition system	(6) (7)				*	
DUTY 2						
11. Replace a worn or worn defective piston	(12) (13)			*		
12. Install piston rings				*		
13. Replace a cylinder				*		
14. Ridge ream top of cylinder				*		
15. Replace connecting rods				*		

TYPE STATION REQUIRED: A = Projector/Tape Player; B = Kit; C = Simulator; D = Live Equipment; E = Special Equipment; F

STUDENTS: 1 JOHN, 2 TOM, 3 MARY, 4 DICK, 5 JANE, 6 DEBBIE, 7 PAT, 8 TED, 9 RUTH, 10 TIM, 11 KEN, 12 JOE, 13 JACK, 14 JIM, 15 LOU, 16, 17

CODE: MODULE STARTED ▞ MODULE FINISHED ▚

14

MANAGEMENT CHART (continued)

MODULES	TYPE STATION REQUIRED: Prerequisites (A)	Projector/ Tape Player (B)	Kit (C)	Simulator (D)	Live Equipment (E)	Special Equipment (F)	STUDENTS: 1 JOHN	2 TOM	3 MARY	4 DICK	5 JANE	6 DEBBIE	7 PAT	8 TED	9 RUTH	10 TIM	11 KEN	12 JOE	13 JACK	14 JIM	15 LOU	16	17
16. Replace a crankshaft		*		*																			
17. Replace a camshaft				*																			
18. Replace oil seals		(2) *		*																			
19. Replace valves and valve seats			*																				
20. Grind valves and valve seats						*																	
DUTY 3																							
21. Remove and clean fuel tank and fuel lines		*	*																				
22. Remove, clean and reinstall fuel filter system																							
23. Service oil bath air cleaner					*																		
24. Service foam type air cleaner					*																		
25. Service dry element air cleaner				*																			
26. Disassemble, clean and reassemble a pulsation-type carburetor		*	(2) *																				
27. Disassemble, clean and reassemble a vacuum-type carburetor		*	*																				
28. Disassemble, clean and reassemble a float-type carburetor			*																				
29. Adjust carburetor needle valve	(28)				*																		
30. Remove and reinstall or replace fuel pipes			*																				

CODE: MODULE STARTED ◪ ; MODULE COMPLETED ■

MANAGEMENT CHART

MODULES	TYPE STATION REQUIRED						STUDENTS																						
	Prerequisites	Projector/ Tape Player	Kit	Simulator	Live Equipment	Special Equipment	JOHN	TOM	MARY	DICK	JANE	DEBBIE	PAT	TED	RUTH	TIM	KEN	JOE	JACK	JIM	LOU								
DUTY 1	A	B	C	D	E	F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17						
1. Install sparkplugs					*																								
2. Remove, inspect and replace flywheel				(2) *																									
3. Replace point plunger			*																										
4. Replace points and condenser			(2) *																										
5. Adjust armature air gap	(3)		*																										
6. Test and replace coil						*																							
7. Test and replace ignition wires					*																								
8. Time ignition system	(3) (5)				*																								
9. Test and replace diode rectifier				(3) *																									
10. Trouble shoot a capacitor discharge ignition system	(6) (7)				*																								
DUTY 2																													
11. Replace a worn or worn defective piston	(12) (13)			*																									
12. Install piston rings				*																									
13. Replace a cylinder				*																									
14. Ridge ream top of cylinder				*																									
15. Replace connecting rods				*																									

CODE: MODULE STARTED ◪ MODULE FINISHED ■

MANAGEMENT CHART (continued)

MODULES	Prerequisites	Projector/ Tape Player	Kit	Simulator	Live Equipment	Special Equipment
	TYPE STATION REQUIRED					
	A	B	C	D	E	F
16. Replace a crankshaft		*		*		
17. Replace a camshaft				*		
18. Replace oil seals		(2) *		*		
19. Replace valves and valve seats			*			
20. Grind valves and valve seats						*
DUTY 3						
21. Remove and clean fuel tank and fuel lines		*	*			
22. Remove, clean and reinstall fuel filter system						
23. Service oil bath air cleaner					*	
24. Service foam type air cleaner					*	
25. Service dry element air cleaner				*		
26. Disassemble, clean and reassemble a pulsation-type carburetor		*	(2) *			
27. Disassemble, clean and reassemble a vacuum-type carburetor		*	*			
28. Disassemble, clean and reassemble a float-type carburetor			*			
29. Adjust carburetor needle valve	(28)				*	
30. Remove and reinstall or replace fuel pipes			*			

STUDENTS: JOHN, TOM, MARY, DICK, JANE, DEBBIE, PAT, TED, RUTH, TIM, KEN, JOE, JACK, JIM, LOU

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

CODE: MODULE STARTED ◪ ; MODULE COMPLETED ■

SECTION V

RECORD KEEPING AND FILING

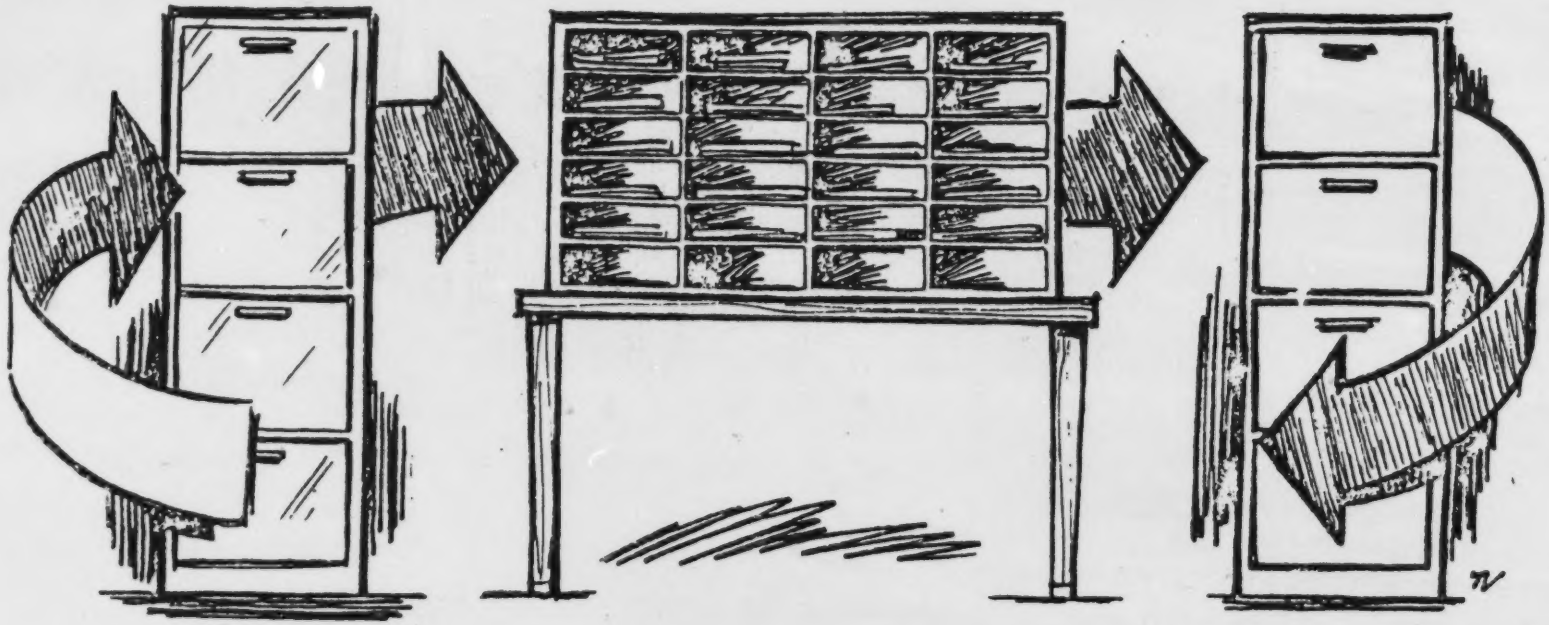
PROGRESS CHARTS

A progress chart similar to the one shown in Module 6 will be helpful in keeping up with each module and the progress of students after the initial assignments are made.

STORAGE FACILITIES FOR MODULES

Keeping up with large numbers of modules can in itself become unwieldy unless some systematic method of storage is used. Three simple and relatively inexpensive alternatives, suggested by Kentucky State Department of Vocational Education, are shown on pages 19 through 21.

ALTERNATE "1"



• FILE CAB. #1 •
FOR STORAGE OF MODULES NOT BEING USED. MODULES TO BE IDENTIFIED BY NAME AND NUMBER And FILED ACCORDINGLY.

• WOODEN CABINET •
EACH STUDENT WILL BE ASSIGNED A COMPARTMENT TO CONTAIN THE MODULE HE IS CURRENTLY STUDYING. WHEN COMPLETED, MODULE IS PLACED IN FILE CAB. # 2.

• FILE CAB. #2 •
FOR TEMPORARY STORAGE OF MODULES WHICH HAVE BEEN COMPLETED BY STUDENTS. MODULES WILL BE FILED BY STUDENT NAME. INSTRUCTOR WILL CHECK MODULES AND RETURN TO FILE CAB. #1.

[2] Ibid. Module 10

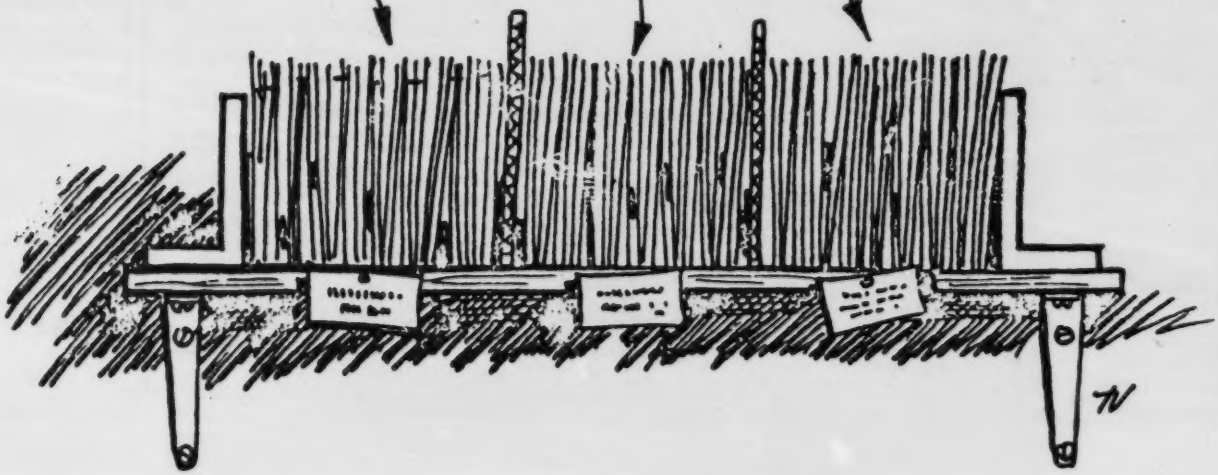
19

ALTERNATE "2"

SECTION #1
FOR MODULES NOT BEING USED.

SECTION #2
FOR MODULES BEING USED BY STUDENTS.

SECTION #3
FOR MODULES WHICH HAVE BEEN COMPLETED BY STUDENTS And READY TO BE RETURNED TO SECTION ONE.

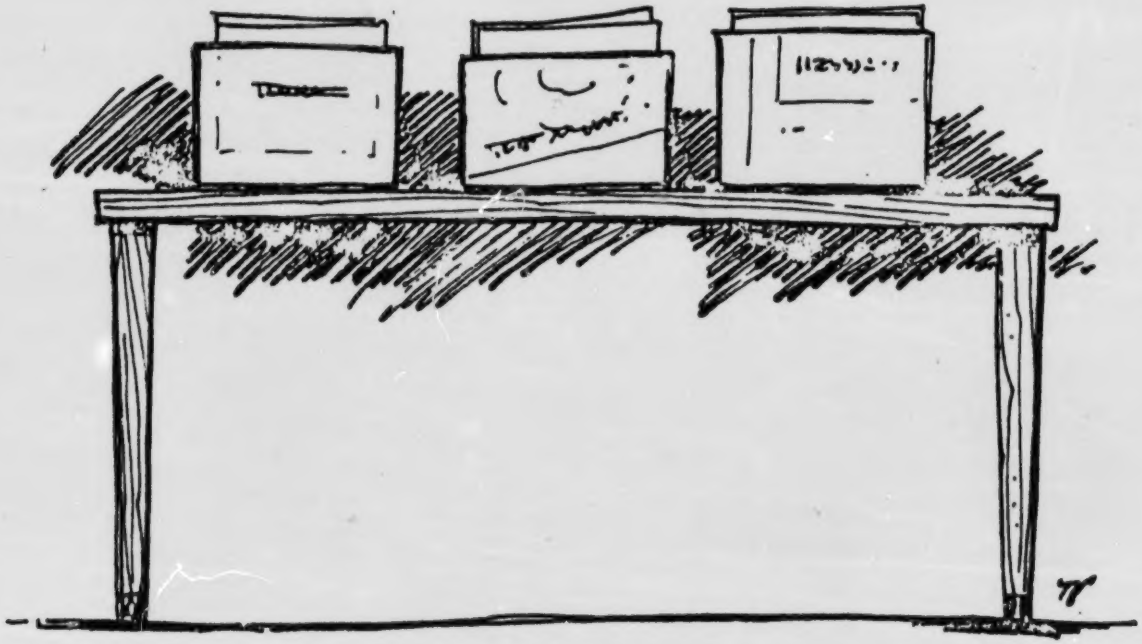


ALTERNATE "3"[4]

• BOX #1 •
FOR STORAGE OF MODULES NOT BEING USED. MODULES TO BE IDENTIFIED BY NAME And NUMBER And FILED ACCORDINGLY.

• BOX #2 •
EACH STUDENT WILL BE ASSIGNED A FOLDER TO CONTAIN THE MODULE HE IS CURRENTLY STUDYING. WHEN COMPLETED, MODULE IS PLACED IN BOX #3.

• BOX #3 •
FOR TEMPORARY STORAGE OF MODULES WHICH HAVE BEEN COMPLETED BY STUDENTS. MODULES WILL BE FILED BY STUDENT NAMES. INSTRUCTOR WILL CHECK MODULES And RETURN TO BOX #1.



[4] Ibid. Module 10

SECTION VI

FACILITIES FOR SELF–PACED INSTRUCTION

SPECIAL FACILITIES FOR SELF-PACED INSTRUCTION

Since students will be working independently most of the time in a fully self-paced program, some special facilities are usually desirable. Some of these facilities are listed below:

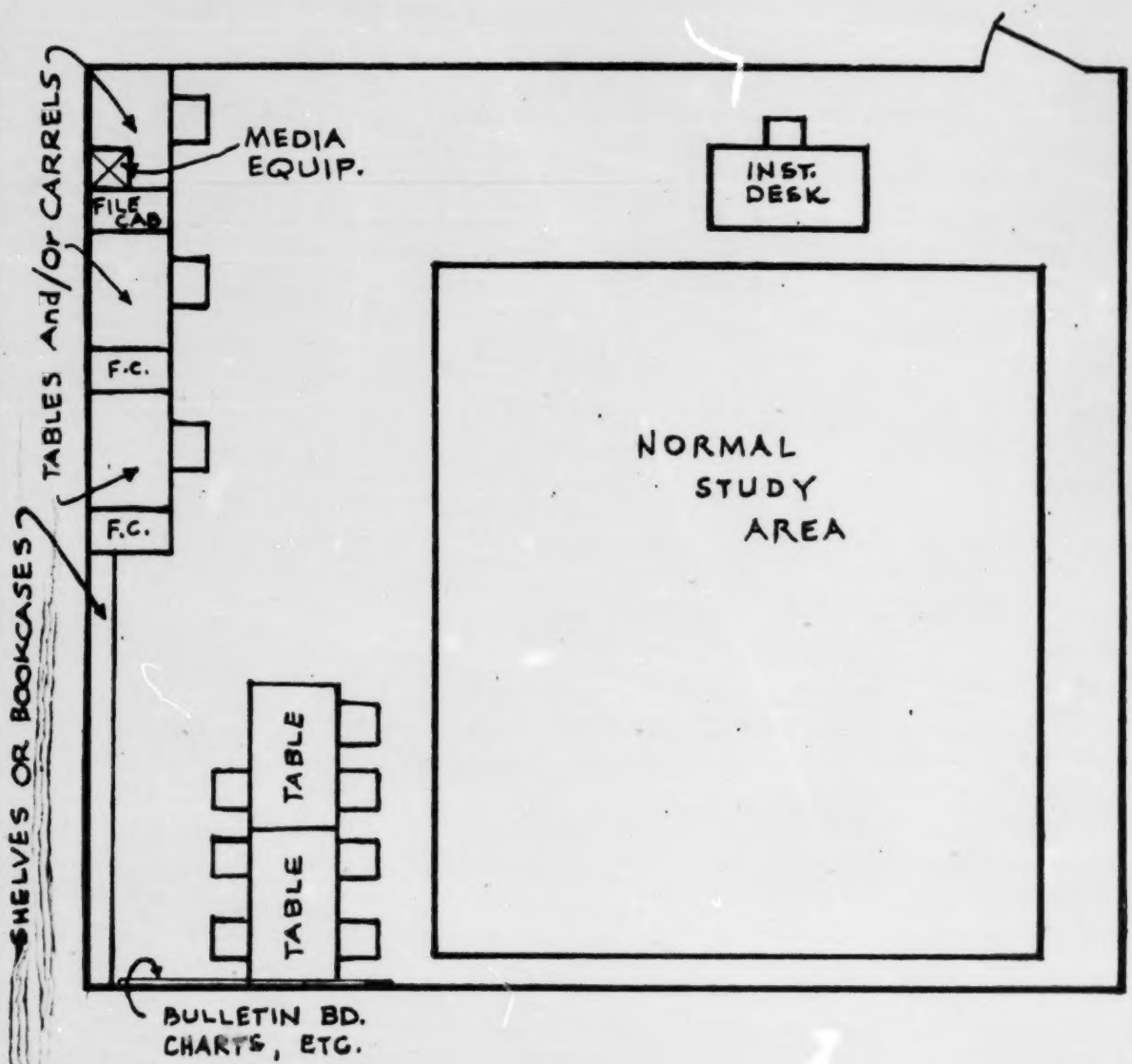
1. an easily accessible library
2. learning carrels (some equipped with slide or filmstrip projectors)
3. learning stations – (an area or room containing special equipment, simulators, and tools for performing selected tasks, e.g., a station set up for brake work). Learning stations differ from learning kits in that they are not usually transportable.
4. learning kits – (a self-contained collection of equipment, tools, and supplies relevant to the performance of a task). The collection is typically stored or transported in a box.
5. a storage area and filing facilities for modules

Some alternative laboratory facilities for the self-paced program are shown on the following pages. The first three such layouts were provided by the Kentucky State Department of Vocational Education.

(A) LEARNING LAB IN A CLASSROOM[5]

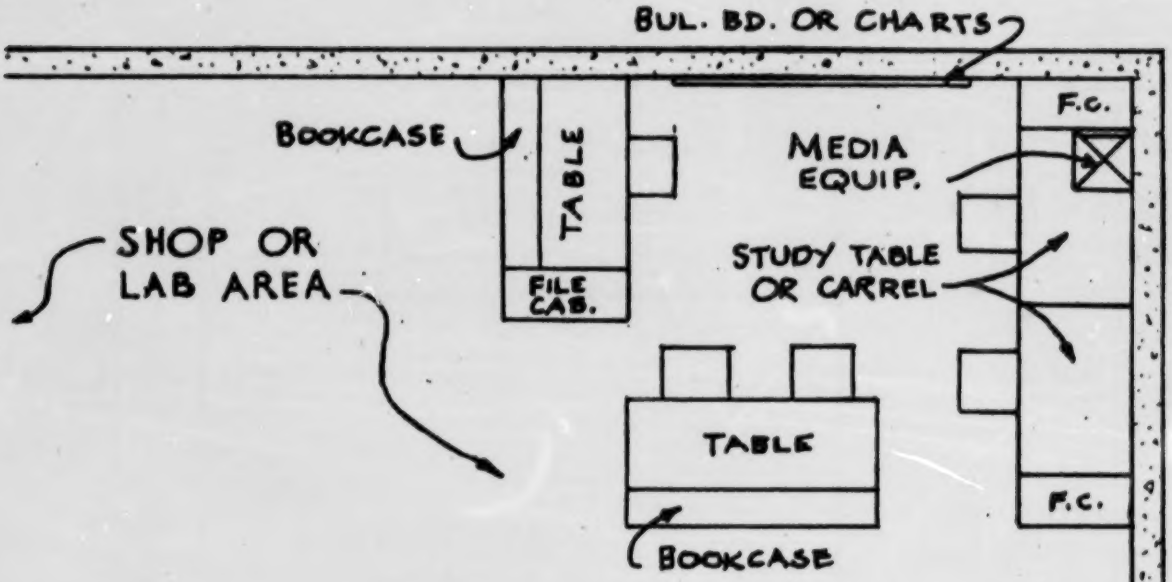
ASSUMPTIONS:

- 20 STUDENTS PER CLASS
- 6-10 STUDENTS USING LEARNING LAB. (EXCEPT DURING "FULL-CLASS SESSION")



[5] Bureau of Vocational Education, Organizing the Learning Center, Inservice Education Module 7. (Lexington, Kentucky: State Department of Education and teh Department of Vocational Education). n.d., pages not numbered.

(B.) LEARNING LAB IN A SCHOOL SHOP[6]



ASSUMPTIONS:

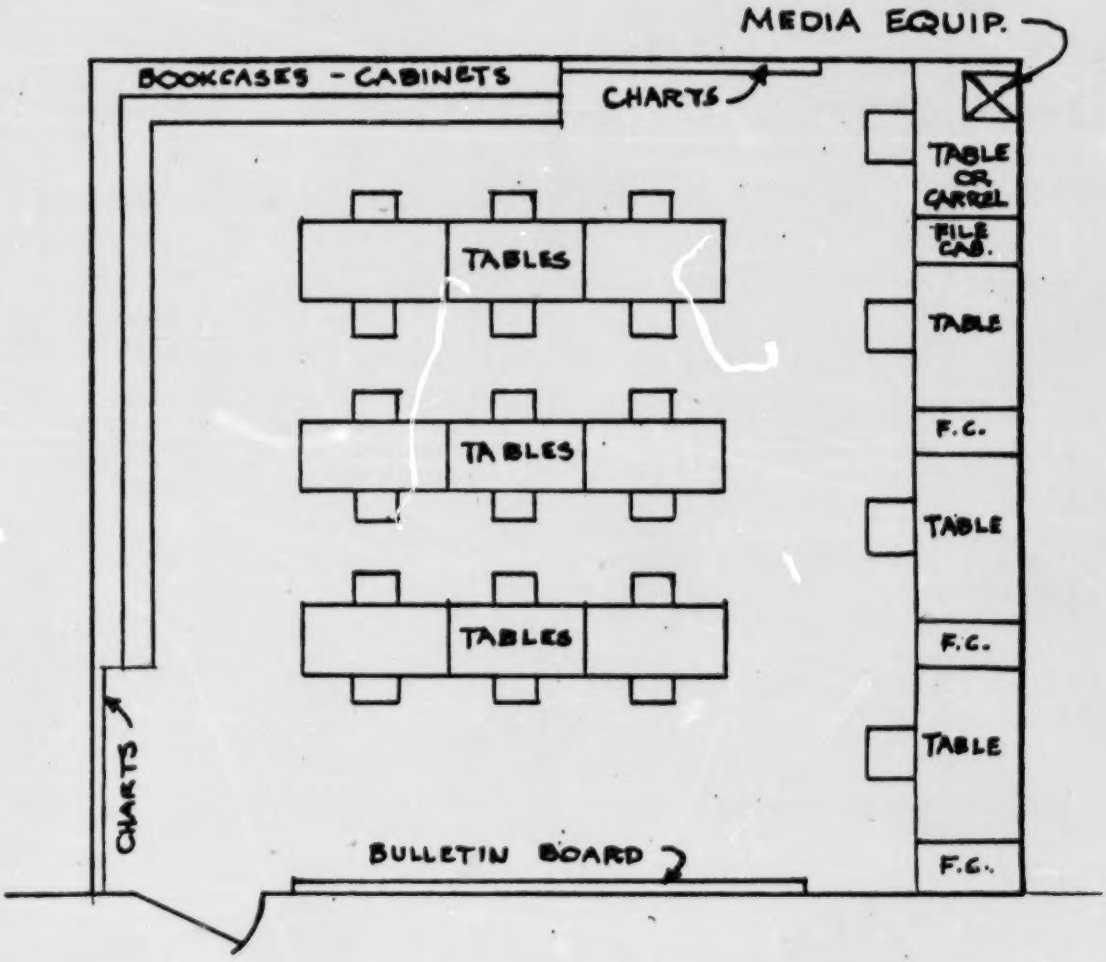
- 20 STUDENTS PER CLASS
- 5 STUDENTS USING LEARNING LAB PER SESSION.

[6] Ibid. Module 7

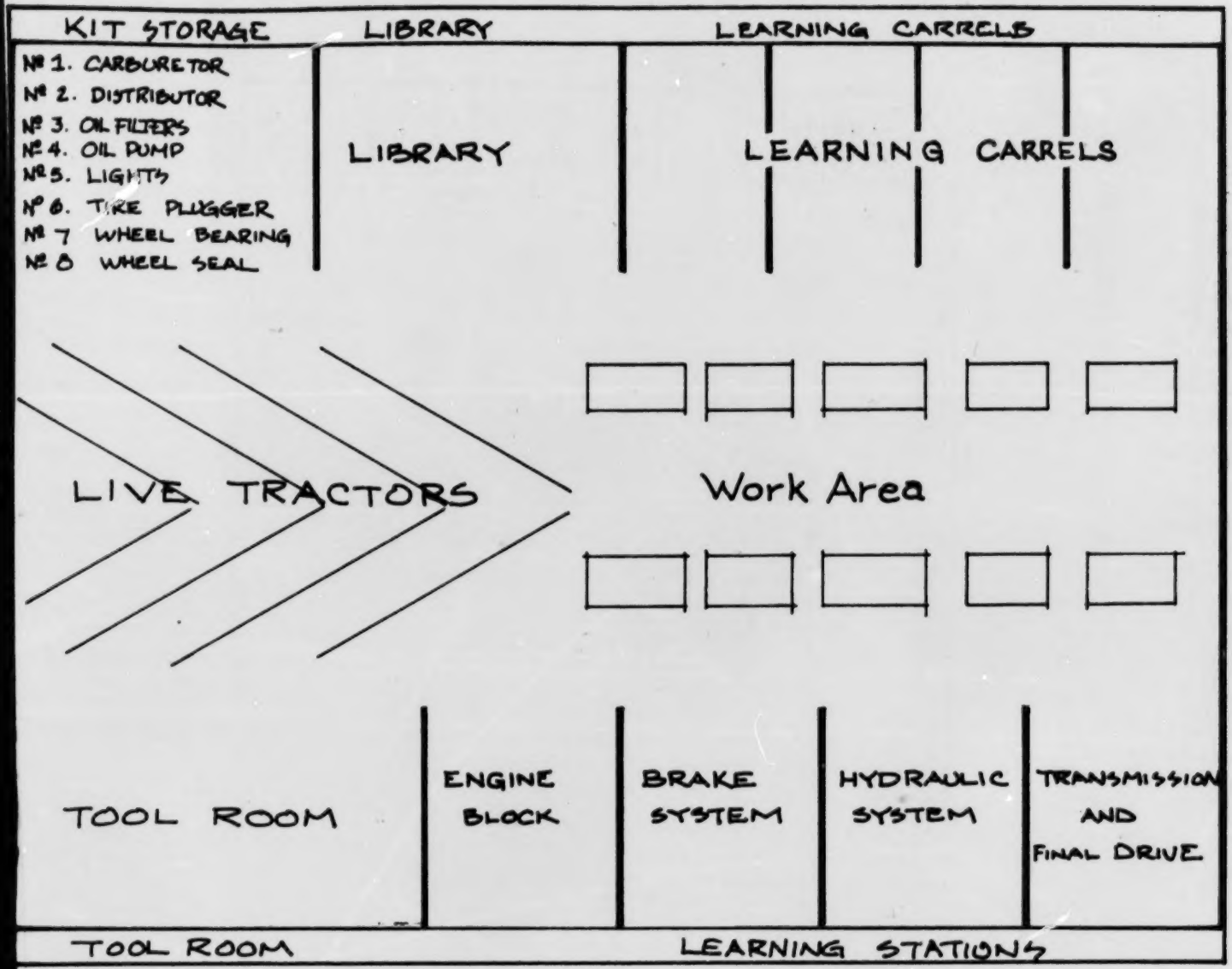
(C.) LEARNING LAB APART FROM A SCHOOL SHOP OR A CLASSROOM[7]

ASSUMPTIONS:

20 STUDENTS USING LEARNING LAB PER SESSION



[7] Ibid. Module 7



(D) LEARNING LAB IN A SHOP (AG. MECHANICS)

SECTION VII

THE USE OF SIMULATORS AND KITS

In some program areas the use of simulation in some form will often be essential and even when not demanded will be desirable in terms of scheduling and efficiency. For example in tractor or auto mechanics, a task such as "Replace the Crankshaft," may not be feasible except through simulation (you wouldn't want to have each student disassemble an entire engine just to get to the crankshaft each time this task was to be done). Likewise, painting a tractor may not be feasible and it may be necessary to provide panels of metal for each student to paint. But, sometimes "live" equipment is necessary. For example, if an engine is to be timed under full power, then a live tractor is almost a necessity. The use of learning kits and simulators can greatly facilitate self-paced instruction.

CHECK-OUT ACTIVITIES

Inform your instructor that you are ready to be tested. You will be provided with a copy of a multiple choice test and an answer sheet. Record your answers on the answer sheet and return both the test and the answer sheet to the instructor.